

<b>Notice of Allowability</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/802,524	VEENINGEN ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Dave Robertson	2121	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 10/14/2009.
2. ☒ The allowed claim(s) is/are 25, 29-32, 34, 36, and 71.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).  
\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.  
(a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached  
1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.  
(b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.  
**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |  |   |
|--|---|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)   | 5. <input type="checkbox"/> Notice of Informal Patent Application                                 |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____. |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br>Paper No./Mail Date <u>10/14/2009</u> | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment                               |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material                     | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance              |
|  | 9. <input type="checkbox"/> Other _____.  |

/D. R./  
Examiner, Art Unit 2121

/Albert DeCady/  
Supervisory Patent Examiner, Art Unit 2121



### **DETAILED ACTION**

1. This is an Examiners Amendment and Reasons for Allowance of all claims pending after entry of the amendments herein. Claims 25, 29-32, 34, 36, and 71 are allowed.

### ***Continued Examination Under 37 CFR 1.114***

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after allowance. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on 10/14/2009 has been entered.

### ***Information Disclosure Statement***

3. The information disclosure statement (IDS) submitted on 10/14/2009 with the filing of the RCE has been considered by the examiner.

### ***Terminal Disclaimer***

4. The terminal disclaimer filed on 10/14/2009 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of Appl. No. 10/802,613 has been reviewed and is accepted. The terminal disclaimer has been recorded.

***Examiner's Amendment***

5. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Atty Henry L. Ehrlich (Reg. No. 39,663) on 10/23/2009.

**In the claims:**

Please cancel claims 26-28, 33, 35, and 37.

Please amend claims 25, 29-32, 34, and 36 as follows:

25. A program storage device readable by a machine tangibly embodying a program of instructions executable by the machine to perform method steps for determining and displaying risk information based on a technical wellbore design and Earth properties, ~~said~~ the method steps comprising:

generating a drillstring design for a wellbore in each hole section of the wellbore in response to a required wellbore geometry and a required wellbore trajectory of the wellbore;

receiving input data, the input data including input data calculation results associated with the wellbore;

comparing each calculation result of the input data calculation results with a logical expression;

ranking by the logical expression each of the input data calculation results, and generating ranked risk values extending along a depth of the wellbore in response thereto, each of the ranked risk values representing an input data calculation result that has been ranked by the logical expression as having a risk selected from the group of a high risk severity, a medium risk severity, and a low risk severity;

generating risk information in response to the ranked risk values, the risk information comprising a ranked risk category, a ranked subcategory risk and a plurality of ranked individual risks; and

displaying the risk information, said risk information display including a simultaneous display of said risk information along said depth of said wellbore.

29. The program storage device of claim ~~[[26]]~~25, wherein the risk category is selected from a group consisting of: an average individual risk, ~~a subcategory risk~~, an average subcategory risk, a total risk, an average total risk, a potential risk for a design task, and an actual risk for the design task.

30. The program storage device of claim 25~~[[29]]~~, wherein the subcategory risk~~[[s]]~~ is selected from a group consisting of: gains risks, losses risks, stuck pipe risks, and mechanical risks.

31. The program storage device of claim 25~~[[28]]~~, wherein ~~said~~the individual risks are selected from a group consisting of: H<sub>2</sub>S and CO<sub>2</sub>, ~~[[H]]~~hydrates, ~~[[W]]~~well water depth, ~~[[T]]~~tortuosity, ~~[[D]]~~dogleg severity, ~~[[D]]~~directional ~~[[D]]~~drilling ~~[[I]]~~index, ~~[[I]]~~inclination, ~~[[H]]~~horizontal displacement, ~~[[C]]~~casing ~~[[W]]~~wear, ~~[[H]]~~high pore pressure, ~~[[L]]~~low pore pressure, ~~[[H]]~~hard rock, ~~[[S]]~~soft ~~[[R]]~~rock, ~~[[H]]~~high temperature, ~~[[W]]~~water-depth to rig

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rating, [[W]]well depth to rig rating, mud weight to kick, mud weight to losses, mud weight to fracture, mud weight window, [[W]]wellbore stability window, wellbore stability, [[H]]hole section length, [[C]]casing design factor, [[H]]hole to casing clearance, casing to casing clearance, casing to bit clearance, casing linear weight, [[C]]casing maximum overpull, [[L]]low top of cement, [[C]]cement to kick, cement to losses, cement to fracture, [[B]]bit excess work, [[B]]bit work, [[B]]bit footage, bit hours, [[B]]bit revolutions, [[B]]bit [[R]]rate of [[P]]penetration, [[D]]drillstring maximum overpull, [[B]]bit compressive strength, [[K]]kick tolerance, [[C]]critical flow rate, [[M]]maximum flow rate, [[S]]small nozzle area, [[S]]standpipe pressure, ECD to fracture, ECD to losses, [[G]]gains, [[G]]gains [[A]]average, [[L]]losses, [[L]]losses average, [[S]]stuck, [[S]]stuck average, [[M]]mechanical, [[M]]mechanical average, [[R]]risk [[A]]average, [[S]]subsea BOP, [[L]]large [[H]]hole, [[S]]small [[H]]hole, [[N]]number of casing strings, [[D]]drillstring parting, and [[C]]cuttings.

32. The program storage device of claim 25[[26]], wherein the step of generating the risk information in response to the ranked risk values comprises the step of receiving the ranked risk values and calculating the ranked risk categories.

34. The program storage device of claim 25[[27]], wherein the step of generating the risk information in response to the ranked risk values comprises the step of receiving ranked risk values and calculating the subcategory risks.

36. The program storage device of claim 25[[28]], wherein the step of generating the risk information in response to the ranked risk values comprises the steps of receiving the ranked risk values and using the ranked risk values to represent the ranked individual risks.

Please add (new) claim 71 as follows:

71. A program storage device readable by a machine tangibly embodying a program of instructions executable by the machine to perform method steps for determining and displaying risk information based on a technical wellbore design and Earth properties, the method steps comprising:

receiving a plurality of input data calculation results associated with the wellbore;

comparing each calculation result of the plurality of input data calculation results with each logical expression of a plurality of logical expressions to rank the calculation result;

calculating a plurality of ranked individual risks extending along a depth of the wellbore in response to the ranking step, each of the plurality of ranked individual risks representing an input data calculation result that has been ranked by the logical expression as having a risk severity selected from the group consisting of a high risk severity, a medium risk severity, and a low risk severity;

generating risk information in response to the plurality of ranked individual risk; and

displaying the risk information, the displaying step including displaying the risk information on a risk information display, the risk information display including a simultaneous display of the plurality of ranked individual risks calculated along the depth of the wellbore.

***Reasons for Allowance***

6. The following is an examiner's statement of reasons for allowance:

The closest prior art of record Weinstock et al. (US 6,223,143) or Goldman et al. (US Pat. 6,109,638), either alone or in view of the prior art of record, do not teach or fairly suggest the methods embodied as program instructions on computer readable medium for determining and displaying risk information based on a technical wellbore design and Earth properties as recited in independent claims 25 and 71 of the present invention as claimed. Claims 25 and 71 have substantially similar scope and rely on the common inventive aspect, with respect to the prior art of record as above, of displaying, simultaneously, along the depth of a wellbore, *a plurality of qualitative risk severity rankings from a plurality of ranked risk values from risk values generated (calculated) based on Earth properties and a designed wellbore geometry and wellbore trajectory* as substantially depicted in Figure 4 of the disclosure of the present invention. Claim 25 differs from claim 71 in what is generated and simultaneously displayed, namely, a plurality of ranked risk values selected from each of *a ranked risk category, a ranked subcategory risk, and a plurality of ranked individual risks*; while claim 71 calculates and displays, simultaneously, *a plurality of ranked individual risks along the depth of the wellbore*.

Specifically, none of Weinstock et al. or Goldman et al. in view of Lavu et al. (US Pat. Pub. 2005/0060213), Booth et al. ("Meeting Future Drilling Planning and Decision Support Requirements: A New Drilling Simulator," Schlumberger: 2001), and/or Union Oil (WO 91/13237), teach or fairly suggest the computer-implemented method as



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*claimed wherein ranked risk values are ranked by [a] logical expression...as having a risk selected from the group of a high risk severity, a medium risk severity, and a low risk severity, in combination with the step(s) of claims 25, 29-32, 34, 36:*

*generating risk information in response to the ranked risk values, the risk information comprising a ranked risk category, a ranked subcategory risk and a plurality of ranked individual risks; and displaying the risk information, said risk information display including a simultaneous display of said risk information along said depth of said wellbore;*

or in combination of the step(s) of claim 71:

*calculating a plurality of ranked individual risks extending along a depth of said wellbore in response to a ranking step and displaying said risk information, the displaying step including displaying said risk information on a risk information display, said risk information display including a simultaneous display of said plurality of ranked individual risks calculated along said depth of said wellbore.*

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dave Robertson whose telephone number is (571)272-8220. The examiner can normally be reached on 8 am to 6 pm, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on (571) 272-3819. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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